



Claims:

35. An apparatus for moving through relative to surface-attached hair-like fibers and facilitating their controlled isolation, comprising:

- A hair isolation area means for substantially isolating at least one surface-attached hair-like fiber from any said surface-attached hair-like fibers trailing it that have yet to enter said hair isolation area means;
- a cued hair supply means for supplying cued surface-attached hair-like fibers that are attached to a surface in which said hair-like fibers are cued substantially in the order that they will enter said hair isolation area means and between two processing cycles said cued surface-attached hair-like fibers remain substantially cued and substantially in the same position relative to said hair isolation area means net of any movement caused by any mechanisms within the outer reaches of said apparatus and net of the advancing movement of said apparatus through said surface-attached hair-like fibers;
- a repeating dispensing means for repeatedly dispensing substantially intact a substantially controlled amount of hair into said hair isolation area means by repeatedly taking hair from said cued hair supply means and dispensing it into said hair isolation area means.

36. The apparatus of claim 35 further comprising:

- a dispensing actuation means for actuating said repeating dispensing means;
- a hair-flow sequencing control means for controlling the actuation of said dispensing actuation means so as to dispense hair into said hair isolation area means at a moment in the processing sequence when said hair isolation area means is ready to accept more hair.

37. The apparatus of claim 35 further comprising:

- a hair processing means for processing said surface-attached hair-like fibers so as to change their cosmetic appearance, whereby it processes hairs in said hair isolation area means;
- a hair processing actuation means for actuating said hair processing means;
- a hair processing sequencing control means for controlling the actuation of said hair processing actuation means in order to cause the actuation of said hair processing means so that processing occurs when said surface-attached hair-like fibers are positioned appropriately relative to said hair processing means so as to be ready for processing.

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4/ 38. The apparatus of claim 35 further comprising a straightening maintenance means for providing and maintaining said surface-attached hairs in a substantially perpendicular orientation relative to their direction of movement through said repeating dispensing means.

5/ 39. The apparatus of claim 38 wherein said straightening maintenance means is a hair tensioning means for applying tension to said surface-attached hairs so as to cause the orientation of their longitudinal shafts relative to the surface which they are attached to be substantially perpendicular. 1-05

6/ 40. The apparatus of claim 38 wherein said straightening maintenance means is a perpendicular orientation sensor control means for providing and maintaining said surface-attached hairs in a substantially perpendicular orientation relative to their direction of movement through said repeating dispensing means by using sensor-controlled movement of said hair isolation area means relative to said surface-attached hairs.

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8/ 41. The apparatus of claim 40 wherein said perpendicular orientation sensor control means is a tension-based sensor-control means for basing hair-isolation-area movement control on tension detected in said surface-attached hair-like fibers.

9/ 42. The apparatus of claim 40 wherein said perpendicular orientation sensor control means is a speed-based sensor control means for basing hair-isolation-area movement control on speed of advancement of said apparatus relative to the surface of hair attachment.

10/ 43. The apparatus of claim 35 wherein said repeating dispensing means is a hair transport means for engaging a limited number of hairs in said cued hair supply means and transporting them into said hair isolation area means.

9 44. The apparatus of claim 43 further comprising a processing means for processing said surface-attached hair-like fibers in a manner so as to change their cosmetic appearance in which at least some of the cosmetic change is facilitated using a force whose source is independent of any force applied by any movement of said hair transport means, whereby said processing means is positioned so as to have access to hairs in said hair isolation area means.

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45. The apparatus of claim 43 further comprising a second hair transport means for engaging the hairs brought to it by said repeating dispensing means and further transporting said hairs, whereby said hairs are passed to said second hair transport means in said hair isolation area means.

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46. The apparatus of claim 35 wherein said repeating dispensing means is a hair pathway obstruction means for intermittently obstructing the path of hair flow from said cued hair supply means to said hair isolation area means.

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47. The apparatus of claim 46 further comprising:

- a hair metering area that is positioned at a point along the hair-flow pathway earlier encountered than said hair pathway obstruction means in which the path of hair flow from said hair metering area into said hair isolation area means is intermittently obstructed by said hair pathway obstruction means;
- a hair pushback gate means for intermittently obstructing the path of hair flow from said cued hair supply means into said metering area so as to isolate a limited number of hairs in said metering area between said hair pushback gate means and said hair pathway obstruction means allowing only the hairs in said metering area to pass said hair pathway obstruction means upon its intermittent allowance of hair flow.

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48. The apparatus of claim 35 further comprising:

- a hair-extension supply means for supplying hair extensions into said hair isolation area means;
- a hair attachment substance means for attaching said hair extensions to said surface-attached hair-like fibers, whereby said attachment substance means provides continued attachment of the hairs;
- a hair attachment substance supply means for supplying said hair attachment substance means into said hair isolation area means in which it comes in contact with both said hair extensions and said surface-attached hair-like fibers so as to attach the two types of fibers together.

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49. The apparatus of claim 48 further comprising an attachment substance supply sequencing control means for controlling said hair attachment substance supply means so as to trigger release of said attachment substance means into said hair isolation area means at a moment in the processing sequence when the hairs to be attached are in said hair isolation area means.

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50. The apparatus of claim 48 further comprising:

- an attachment substance fixation means for fixing said attachment substance means so as to accelerate the attachment of said hair extensions to said surface-attached hair-like fibers;
- an attachment substance fixation supply means for supplying said attachment substance fixation means into said hair isolation area means so that it may be introduced to said attachment substance means in order to facilitate accelerated attachment of the hairs.

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51. The apparatus of claim 48 further comprising an excess attachment substance removal means for removing any excess of said attachment substance means from said hair isolation area means so as to leave a coating of said attachment substance means on the hairs to be attached.

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52. The apparatus of claim 35 further comprising:

- a longitudinal hair movement means for moving at least one of said surface-attached hair-like fibers in a longitudinal direction along its shaft relative to and through said hair isolation area means so as to convey a length of said surface-attached hair-like fiber through said hair isolation area means;
- a coating substance;
- a coating substance supply means for supplying said coating substance into the interior of said hair isolation area means so as to coat said surface-attached hair-like fiber as it is conveyed longitudinally through said hair isolation area means.

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53. The apparatus of claim 35 further comprising:

- a longitudinal hair movement means for moving at least one of said hair surface-attached hair-like fibers in a longitudinal direction along its shaft relative to and through said hair isolation area means so as to convey a length of said surface-attached hair-like fiber through said hair isolation area means;
- a cross-sectional reshaping means for reshaping the cross-sectional shape of said surface-attached hair-like fiber as it is conveyed longitudinally through said cross-sectional reshaping means by said longitudinal hair movement means, whereby said cross-sectional reshaping means substantially overlaps said hair isolation area means.

54. The apparatus of claim 35 further comprising:

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- a hair surface row segregation means for segregating said surface-attached hair-like fibers substantially originating from two adjacent surface areas so that the segments of the hair shafts that will be processed are segregated in a specific row prior to and during hair dispensing by said repeating dispensing means and said hair surface row segregation means rests on the surface to which said surfaced-attached hair-like fibers are attached and is substantially stationary relative to said surface during processing, whereby the phrase substantially stationary refers to the net movement of said hair surface row segregation means as a whole but a given area of it may flex or move as said apparatus moves by it and said hair surface row segregation means can rest on any contiguous area of said surface to which said surface-attached hair-like fibers are attached not only those areas to which the hair fibers are directly attached;

- a track guide means for guiding said apparatus by substantially continuous contact between said track guide means and said apparatus so as to provide alignment with one of the segregated rows of surface-attached hair-like fibers to allow the hair segments from substantially only this single segregated row to be guided into said apparatus as it moves along a substantially defined path that substantially coincides with said single segregated row and this alignment during apparatus movement is possible individually for both adjacent rows of segregated surface-attached hair segments.

55. The apparatus of claim 54 further comprising:

- a position ascertaining means for ascertaining longitudinal position of said apparatus along said track guide means;
- a row determinant means for ascertaining within which of the segregated rows said apparatus is positioned;
- a longitudinal conveyance means for conveying a longitudinal segment of a group of at least one surface-attached hairs longitudinally through said apparatus;
- a hair length measurement means for ascertaining the longitudinal length of said longitudinal segment of the group of surface-attached hairs that has been conveyed through said apparatus by said longitudinal conveyance means;
- a cutting means for cutting hair in said hair isolation area means;
- a cutting control means for using data coming from said position ascertaining means and said row determinant means and said hair length measurement means and corresponding to a longitudinal

position along a specific row to reference recorded hair length data corresponding to said position so as to trigger said cutting means to cut the group of longitudinally conveyed hairs at a moment when the group's linear length measured from said cutting means to the surface of hair attachment approximately equals the recorded hair length.

22/ 36. The apparatus of claim 35 further comprising a bend-under means for applying a conveying force that conveys the hair-like fibers through said apparatus at a rate faster than said apparatus moves relative to the surface of hair attachment causing said hair-like fibers to be conveyed longitudinally along their shafts through and under said apparatus.

22/ 37. The apparatus of claim 36 wherein said bend-under means is a below apparatus bend-under means for engaging said surface-attached hair-like fibers at a location beneath said apparatus and at this location applying a conveying force that conveys the hair-like fibers at a rate faster than said apparatus moves relative to the surface of hair attachment causing said hair-like fibers to be conveyed longitudinally along their shafts through and under said apparatus.

Blind Control 22/ 38. The apparatus of claim 36 wherein said bend-under means is a rotary conveyance means for applying a conveying force by engaging said surface-attached hair-like fibers at a point which moves on a rotary mechanism.

25/ 22/ 39. The apparatus of claim 36 wherein said bend-under means is an apparatus elevation conveyance means for applying a conveying force by elevating said apparatus away from the surface to which said hair-like fibers are attached.

24/ 40. The apparatus of claim 35 further comprising:

- an attachment substance degrading means for degrading an attachment substance that is holding hair extensions together with said surface-attached hair-like fibers;
- an attachment degrading application means for applying said attachment substance application degrading means to hairs isolated in said hair isolation area means;
- a detached hair extension separation conveyance means for conveying hair extensions detached by said attachment substance degrading means away from said surface-attached hair-like fibers.

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61. The apparatus of claim 35 further comprising:

- a hair-flow reversing means for causing surface-attached hairs that have entered said hair isolation area means to exit it substantially from the direction that they entered;
- an exiting hair separation means for intermittently separating the hairs that reversed direction and exited said hair isolation area means from the hairs in said cued hair supply means and said exiting hair separation means is positioned between said hair isolation area means and said cued hair supply means;
- a reversed hair exit pathway means for allowing the hairs that have been reversed out of said hair isolation area means by said hair-flow reversing means to exit said apparatus and its origin is positioned between said exiting hair separation means and said hair isolation area means and its terminus is positioned lateral to the path of hair flow into said repeating dispensing means so as to direct the exiting hairs away from reentering said repeating dispensing means.

62. An apparatus for moving through relative to surface-attached hair-like fibers so as to attach hair extensions to said surface-attached hair-like fibers, comprising:

- a hair attachment area in which said hair extensions are attached to said surface-attached hair-like fibers;
- a hair-extension supply means for supplying hair extensions into said hair attachment area;
- a surface-attached hair-like fiber supply means for supplying said surface-attached hair-like fibers into said attachment area;
- a hair attachment substance means for attaching said hair extensions to said surface-attached hair-like fibers, whereby said attachment substance means provides continued attachment of the hairs;
- a hair attachment substance supply means for supplying said hair attachment substance means into said hair attachment area in which it comes in contact with both said hair extensions and said surface-attached hair-like fibers so as to attach the two types of fibers together.

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63. The apparatus of claim 62 further comprising an attachment substance supply sequencing control means for controlling said hair attachment substance supply means so as to trigger release of said attachment substance means into said hair attachment area at a moment in the processing sequence when the hairs to be attached are in said hair attachment area.

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64. An apparatus for the processing of hairs which are attached to a surface configured so that processing of any hair only occurs a substantially controlled number of times, comprising:

- a hair processing means for processing surface-attached hair-like fibers so as to change their appearance as a group;
- a hair surface row segregation means for segregating said surface-attached hair-like fibers substantially originating from two adjacent surface areas so that the segments of the hair shafts that will be processed are segregated in a specific row prior to and during processing by said hair processing means and said hair surface row segregation means rests on the surface to which said surface-attached hair-like fibers are attached and is substantially stationary relative to said surface during processing, whereby the phrase substantially stationary refers to the net movement of said hair surface row segregation means as a whole but a given area of it may flex or move as said apparatus moves by it and said hair surface row segregation means can rest on any contiguous area of the surface to which said surface-attached hair-like fibers are attached not only those areas to which the hair fibers are directly attached;
- a track guide means for guiding said apparatus by substantially continuous contact between said track guide means and said apparatus so as to provide alignment with one of the segregated rows of surface-attached hair-like fibers to allow the hair segments from substantially only this single segregated row to be guided into said apparatus as it moves along a substantially defined path that substantially coincides with said single segregated and this alignment during apparatus movement is possible individually for both adjacent rows of segregated surface-attached hair segments.

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65. The apparatus of claim 64 wherein said hair processing means is a means for moving through relative to surface-attached hair-like fibers so as to attach hair extensions to said surface-attached hair-like fibers and further comprising:

- a hair attachment area in which said hair extensions are attached to said surface-attached hair-like fibers;
- a hair-extension supply means for supplying hair extensions into said hair attachment area;
- a surface-attached hair-like fiber supply means for supplying said surface-attached hair-like fibers into said attachment area;

- a hair attachment substance means for attaching said hair extensions to said surface-attached hair-like fibers, whereby said attachment substance means provides continued attachment of the hairs;
- a hair attachment substance supply means for supplying said hair attachment substance means into said hair attachment area in which it comes in contact with both said hair extensions and said surface-attached hair-like fibers so as to attach the two types of fibers together.

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66. An apparatus for attaching non-surface-attached hair-like fibers to a surface amongst surface-attached hair-like fibers already attached to said surface, comprising:

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- a hair channel pathway means for guiding said surface-attached hair-like fibers into an area of high concentration coinciding with said hair channel pathway means so as to leave an area of decreased surface-attached hair-like fiber concentration lateral to said hair channel pathway means;
  - an attachment area means for attaching non-surface-attached hairs to said surface that is positioned to substantially coincide with said area of decreased surface-attached hair-like fiber concentration;
  - a supply means for supplying said non-surface-attached hair-like fibers into said attachment area means;
  - an attachment means for attaching said non-surface-attached hair fibers to said surface within said attachment area means, whereby said non-surface-attached fibers may either be attached directly to said surface or indirectly attached to said surface by way of attachment to the pre-existing surface-attached fibers.